

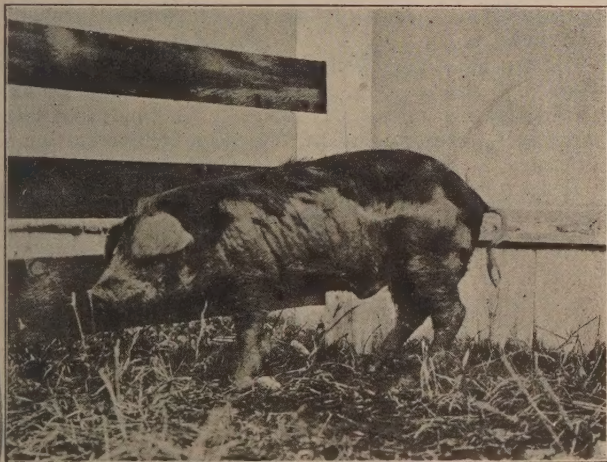
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CHRONIC FORM OF HOG CHOLERA

Hog Cholera in Idaho

BY

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Any farmer, teacher or student in the State may have the bulletins from the University mailed to his address free of charge upon application to Director Idaho Experiment Station, Moscow, Idaho.

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HOG CHOLERA

INTRODUCTION

In the fall of 1912 the Idaho Experiment Station was appealed to by the veterinarians and farmers of South Idaho for assistance in identifying a disease that was doing great damage to the hog industry of that part of the state. A veterinarian was sent at once into the field and after a thoro examination into the trouble pronounced it a modified form of hog cholera. Up to that time the state had lost several thousand hogs, with little suspicion that the trouble was the old enemy, hog cholera, that has worked such havoc in the Mississippi Valley since its first introduction into Ohio in 1833.

During the twelfth session of the Idaho legislature which was in session in January and February of this year, the swine breeders of the state asked for relief in the way of an appropriation for the manufacture of hog cholera serum, the only known substance found to cope with this disease. In response to this request, the legislature appropriated \$5,000 to the State Experiment Station for the manufacture of this serum at the University at Moscow. The law provided that all the serum manufactured at the University should be sent to the State Veterinarian, who in turn thru his deputies, was the only one who could administer the preventive.

A nominal charge of 25 cents per dose was all that the law allowed the State Veterinarian to charge for the serum.

As soon as the appropriation was available in March of this year the University began to carry out the provision of the law. In order to be absolutely sure of results, several months were consumed in producing a serum of the required strength. It was necessary to build suitable laboratories to carry on the work. It was also necessary to test out the disease from various sources before a type of the disease was found which would develop a serum that would protect hogs from the worst types of the disease. It was estimated by the University that \$5000 would be necessary to establish and equip a plant sufficiently large to meet the demands at that time for serum in this state, and that the sale of the serum to the farmers, at actual cost, would maintain such

a plant. When the legislature fixed the price of serum at 25 cents per dose, the returns from the sale of serum was not sufficient to meet the expense of the plant, and the \$5,000 was soon exhausted. It costs approximately 2 cents per cubic centimeter to manufacture the serum. Some hogs require 35 cubic centimeters while large ones may require as much as 120 cubic centimeters. The plant with its full equipment sufficiently large to manufacture 20,000 cubic centimeters per week, an amount sufficient to inoculate about 500 hogs, cost approximately \$3000, the balance having been expended to date in purchase of serum for immediate use in the state and in experimentation.

The appropriation having been exhausted, the Live Stock Sanitary Board of the state made provision for the continuance of the manufacture of serum at the University to be furnished at actual cost. Serum is now being produced at the rate of about 18,000 cubic centimeters, or enough for 450 head of hogs, per week. This amount is being steadily increased until the capacity of the plant is reached which amount will be about 20,000 cubic centimeters per week.

This amount is not enough for the needs of the state at the present time. It is believed, however, that this constant supply will be sufficient when the spread of the disease has been checked and will continue to meet the needs if the farmers of the state will cooperate with the Live Stock Sanitary Board by keeping it advised as to new outbreaks. Much loss and expense can be saved if treatment is given when only a few hogs are sick in a locality and before the epidemic becomes widespread.

WHAT IS HOG CHOLERA

Hog cholera is a specific, highly contagious disease of swine, where the mortality runs about 80 per cent. Formerly the disease was confined mainly to the corn-belt in the middle western states, but its spread has been so rapid in the last ten years that it is now found in nearly every state of the union.

CAUSE OF THE DISEASE

For a long time cholera was attributed to several different organisms that had been found in the blood of sick animals, or hogs dead from the disease. After careful investigation the Bureau of Animal Industry of the United States Department of Agriculture, came to the conclusion that hog cholera was due to an organism in the blood which is too small to be seen by the most powerful microscope and which can pass thru the finest pores of

a porcelain filter. The infection passes readily from one animal to another by means of the feces, urine, blood, flesh, or other body substances.

Hog cholera as it appears in Idaho and other parts of the Northwest differs somewhat widely in its symptoms and in the character of the disease from the form that has become so common in the corn-belt states. There can be no doubt but that it is the same disease but appears in a modified and less virulent form. The officers of the Bureau of Animal Industry believe this attenuated or weakened form of the disease may be due to climatic and other natural conditions. The contagiousness is just as great, however, with one form as in the other, the chief difference being found in the effect upon the animals.

SYMPTOMS

Hog cholera cannot be positively diagnosed from external symptoms alone, as they vary greatly in different animals. There are two main types, acute and chronic. The first hogs in a herd to contract the disease will usually show the acute type, later they will show more of the chronic form. Cholera tends to become chronic as cold weather approaches. In the hot months the acute type is the most common. Sometimes the disease is so acute that hogs will die without showing any external diagnostic symptoms.

Loss of appetite is usually the first symptom shown. If the animal's temperature is taken it will usually show 105 to 106 degree F. The sick hogs will lag behind the rest of the herd or will stand huddled up in a corner. Frequently they will bury themselves in their bedding. Later they will show a staggering gait and are especially weak in the hind quarters. At this time they are constipated and the feces are covered with a mucous coat and may be streaked with blood. In a few days they will usually show a diarrhoea and will lose flesh rapidly.

The nose and eyes frequently will show a purulent discharge. This discharge often pastes the lids of the eyes together and causes the hogs to breathe with a snuffling sound. Coughing may be noticed in the early stages, and the breathing will become more laborious as the disease progresses. Redness of the skin is often noticed especially in white hogs. This redness is found most commonly on the insides of the thighs, on the abdomen, and behind the ears. Just before and after death this will change to a dark purple color. The temperature may register as high as 107 to 108 degrees F.

POST-MORTEM

On post-mortem examination one will find the lymph glands or kernels swollen and black in color. Normally they are gray.

The lungs will be inflamed, certain areas appearing solid and dark like a piece of liver. The linings of the chest and abdominal cavities sometimes are inflamed and frequently the lungs or intestines are adhered to them. The linings of the intestines are swollen and will show ulcers, especially where the small intestines empty into the large. This symptom is diagnostic of cholera and is found more often where the animal lives a week or more after showing the first symptoms. The kidneys are softer and lighter in color than normal. They will show small pinpoint hemorrhages beneath the capsule and thru the substance of the kidney, giving them the so-called turkey-egg appearance. The bladder may show small hemorrhages, both on its internal and external linings.

Lung worms, pneumonia, and poisoning by garbage may all be mistaken for cholera. When afflicted with lung worms the animals will cough and post mortem changes will show a pneumonia, but if the infected portions be incised one can find a hair-like worm about one and a half inches long. Only small pigs are usually affected.

Pneumonia due to other causes may cause confusion. However, the lungs are the only organs that will show the changes which are characteristic of cholera. Poisoning by garbage that contains much alkali soaps will show symptoms that resemble cholera very much. Post mortem findings will clear up the diagnosis.

HOW CHOLERA IS SPREAD

There are numerous ways in which cholera may be spread to a new locality. Probably the most common way is thru infected meat being sold on the market, and subsequently being fed to hogs either by being hauled from town in garbage from restaurants, or by feeding table refuse to the hogs without thoroughly boiling and killing the organisms. Affected hogs may be introduced into the herd before they show the symptoms of cholera, or they may have the disease in the chronic form.

The disease may be carried to a nearby healthy herd by employees, visitors, or others who have walked thru an infected lot. Dogs, cats, birds, or immune hogs may serve as carriers. Streams of water which run thru an infected lot may spread the disease to herds lower down on the stream. Railroads may spread the disease as it is a common practice in hog cholera districts to send the hogs to market when they show the first symptoms of the disease. The excreta of sick hogs may be thrown

from the cars into a lot or it may be carried on the feet of persons or animals walking along the car lines. Improper vaccination by the simultaneous method is undoubtedly the cause of the disease in some localities.

Many outbreaks of cholera could be prevented by proper precautions. The owner or his employees should not visit infected herds, and should avoid walking thru any hog lots where there is cholera in the vicinity. Dogs and other animals which have a tendency to roam around the neighborhood should be tied up. Hogs should be kept from a stream where cholera occurs above them on the same stream. Garbage from town or pork refuse from the table should not be fed unless thoroly cooked. Newly purchased hogs should be isolated from the rest of the herd for a period of three weeks. Hogs sent to fairs should be treated with serum and isolated for three weeks on returning unless the rest of the herd have been treated with serum.

DISPOSAL OF CARCASSES

The carcasses of all hogs which have died from the disease should be burned. The Idaho law compels the owner to burn the carcasses of all hogs dead with the cholera.

DISINFECTION

Disinfection of the premises is the best means we have of preventing the spread of the disease. Burn all of the litter in and around the pens. If the pens and houses are not of sufficient value to warrant disinfecting them, or if they are such a shape that disinfection is impossible, it will pay the farmer to destroy them by burning, and remove the hogs to another lot. A pint of one of the coal tar dips in 10 quarts of water thoroly sprayed around the buildings and feed troughs used by the sick hogs, by means of a strong spray pump, has been found to give good results. After disinfection, a good coat of whitewash should be applied to the fences and the inside and outside of the houses. The floors of the pens and the lots should be sprinkled with un-slacked lime. Where the lots are large they should be plowed and cultivated frequently. All feeding utensils and troughs should be scalded with boiling water.

PREVENTIVE TREATMENT

Hog cholera serum is the only known agent that will prevent hog cholera. This treatment is known as immunization. The serum contains immune bodies which will combat the germs in

the animals' bodies, that are capable of producing the disease. These immune bodies are present in the blood of hogs that have recovered from the cholera.

There are several different methods of immunizing hogs for the cholera.

1. SERUM ALONE METHOD

Hogs that have been treated with serum alone, and not exposed to the cholera, do not form immune bodies of their own, but get them thru the serum. This is known as passive immunity and the hogs treated by this method have an immunity to cholera for a brief period only (three to eight weeks.) This method is advised for hogs that are to be taken to fairs, for show purposes and for a preventative in recently infected herds.

2. SIMULTANEOUS OR DOUBLE METHOD

This method consists in injecting serum and cholera virus or infection at the same time. Virus is the blood from a hog sick with the cholera. The serum and virus should be injected with different syringes in different portions of the animal's body. This method is recommended for healthy herds in a community in which many herds are infected. The virus will give the hogs the disease, but the serum will prevent it from overwhelming the hog's system. There is actual danger that cholera be introduced into a healthy herd, unless great care is exercised in the use of the simultaneous method. The serum alone has no virus in it and will not produce a hog cholera, but the virus will cause the disease. Only a qualified, careful, and conscientious veterinarian should use this method. The immunity resulting from this method is enduring, the hog only requiring one treatment during its life. There is some loss with this treatment also which cannot always be prevented.

No claim is made for the serum as a curative agent. It is a preventive, if given with proper care and by a competent person. Usually hogs already sick and showing a temperature of 105 degrees F. are not treated, altho some have saved a small per cent of the sick hogs by using heavy doses of the serum.

Hogs that cannot be handled, such as pregnant sows, may be injected behind the ears.

Hogs should be fed sparingly for twenty-four hours before injecting with serum. If possible, they should be run into small lots, so as to prevent unnecessary chasing and warming of the animals. The lot should be dry, clean, and well lighted. After

injection they should not be turned into a lot in which there are mud wallows. A little care on the part of the farmer will prevent much unnecessary abscess formation at the point of injection. One of the most important points is to thoroly cleanse the skin where the serum is to be injected. A good method is to scrub the skin with a stiff brush and soap and warm water, until the dirt and oily secretions of the skin are removed. The soap can be removed with a wad of cotton saturated with alcohol. After injection again wipe off the spot with alcohol. The use of alcohol will prevent many abscesses being formed.

HOW THE SERUM IS MADE

Before serum can be produced, virus or blood from a hog about to die of very acute cholera, must be obtained. This blood should then be in the most virulent state or will contain a great number of cholera organisms. At the Idaho Plant virus is obtained from pigs weighing from 80 to 100 lbs., as pigs of this size are more susceptible to the disease and have it in the most typical and acute forms. These pigs are made to take the cholera by being injected with a small amount of virulent blood taken from some hog about to die from the disease. In this way it is possible to obtain a very potent strain of virus. In about from four to seven days after the susceptible pigs are injected with the virus they begin to lose their appetites and to show symptoms of cholera. They are then carefully watched for a few days and their temperature taken frequently. When they weaken so that they cannot stand and seem about to die, they are killed and all their blood taken. A pig weighing about 100 lbs. should bleed about 1300 cubic centimeters of virus. This blood is taken under the most aseptic conditions possible. The pig is hung by its hind legs and securely fastened to prevent struggling. Its body is then washed and a damp cloth is hung over it to prevent any dust or dirt from falling into the blood. The throat is scrubbed, shaved, and disinfected. Then, with a sharp and previously sterilized knife, the operator makes a long vertical incision in the throat, dissects away the muscles over the carotid artery and severs the artery. The blood is caught in a sterilized porcelain lined cup. Every instrument and receptacle used in collecting and handling this blood is absolutely sterile and every precaution is taken to prevent contamination. After the blood is drawn, it is whipped with a wire beater to separate the clot from the liquid portion. This is called difibrinating. The liquid part is then strained thru a sterile cloth over a funnel and collected in a sterile bottle and the bottle plugged with sterile cotton. This is the *virus* and contains the live cholera organisms, and is extremely dangerous for

farmers and stockmen to handle because of the danger of scattering the disease broadcast over their farms and into their neighbors' herds. This virus is used in connection with serum to vaccinate susceptible hogs against cholera and also to hyper-immunize immune hogs.

PRODUCING THE SERUM

Hogs which are naturally immune or have had the disease and recovered from it, have in their bodies certain invisible substances known as antibodies. These antibodies have the property of protecting the hog from the organism which causes cholera. In an immune hog these bodies do not exist in sufficient numbers to protect other susceptible hogs, should this blood be used, unless it is used in very large quantities. To obtain a greater number of these antibodies the hog must be *hyper-immune*, that is, it must have in its blood a greater number of antibodies than is required to protect itself. To make it hyper-immune, a large quantity of virus is injected into its blood. This virus stimulates the body cells of an immune hog to throw off a greater number of antibodies than is required to protect itself. This hyper-immune hog furnishes the serum which is used to protect susceptible hogs against the disease. The serum contains the antibodies while the virus contains the live disease producing organisms. To produce serum the best size of hogs has been found to be from 140 to 200 lbs. If the hogs are not immune they may be immunized by injecting into their bodies a small amount of serum, together with a little virus. They may then be hyper-immunized in about ten days. This hyper-immunization may be done in one of several ways: (1) By the intravenous methods, the hog is securely tied and 6 cubic centimeters of virus per pound of hog is injected thru one of the veins of the ear. (2) By the intra-abdominal method, the hog is hung by its hind legs and 10 cubic centimeters per lb. of hog is injected into the abdominal cavity. (3) By the subcutaneous method, 12 cubic centimeters per lb. of hog is injected just beneath the skin. (4) By the slow subcutaneous method, three injections of about a week apart, are made. The first week one cubic centimeter per lb. of hog is injected, the second week 3 cubic centimeters per lb. of hog, and the third week 5 cubic centimeters per lb. of hog is injected. In about ten days these hogs will be ready to produce the serum. In bleeding for serum the hog is confined in a crate or on a table. The rear half of the body, with the exception of the tail, is covered with a damp cloth to prevent germs and dust from falling into the blood and spoiling the serum. The tail is scrubbed, shaved, and disinfected. Then with a sharp sterile knife, the end of the tail is cut off and

the blood caught in a sterile pan. This blood is then whipped with a sterile wire beater until the clot has separated from the liquid portion of the blood. This liquid is the serum and is now stained thru a sterile cloth into a bottle. After it is bottled a small quantity of a preservative is added to partially preserve it, and it is stored in a dark place of low even temperature until it is tested. After the hog has been bled three times at seven-day intervals, it may be *re*-hyperimmunized. This second injection does not require quite as much virus as the first time, as the cells of the body are more easily stimulated to produce the antibodies. The hog may be rehypered two or three times and then killed and all of its blood taken for serum. A 200-lb. hog should bleed each time from 1000 to 1200 cubic centimeters of blood and when this is repeated about six times and then all the blood taken, it should amount to about 8500 cubic centimeters of serum or enough to protect about 283 100-lb. pigs against taking the cholera.

DIRECTIONS FOR USING THE SERUM

Standard Dose of Serum

Hogs weighing up to 20 pounds	10 cc.
Hogs weighing 20 to 50 pounds	15 cc.
Hogs weighing 50 to 75 pounds	20 cc.
Hogs weighing 75 to 100 pounds	25 cc.
Hogs weighing 100 to 150 pounds	30 cc.
Hogs weighing 150 to 200 pounds	35 cc.
Hogs weighing over 200 pounds	40-60 cc.

In herds where cholera has made its appearance the above serum doses should be increased 50 per cent.

In herds where the simultaneous treatment with virus, for permanent immunity is used, the above serum doses should be increased 100 per cent, i. e., doubled.

Hogs must not be excited or heated prior to or at the time of vaccination. Handle heavy hogs as little as possible and release promptly. Do not vaccinate sick hogs.

Virus Dose

Hogs weighing up to 20 pounds	.5 cc.
Hogs weighing 20 to 100 pounds	1. cc.
Hogs weighing 100 to 200 pounds	1.5 cc.
Hogs weighing over 200 pounds	2 cc.

The serum should be kept in a cool dark place and not uncorked until required for use. Any serum left over should be

thrown away and not kept. A bottle once opened and left on hand might become polluted with germs that cause blood poisoning.

In Idaho all requests for serum should be made to the State Veterinarian at Boise.

WHAT CAN BE EXPECTED

If every farmer in Idaho would cooperate in the work of eradication of Hog Cholera, and notify the State Veterinarian or one of his deputies of *any illness* in his herd resembling hog cholera, and would vaccinate his hogs in case the cholera appeared in his or his neighbor's herds, hog cholera would soon be stamped out. District after district could be freed from the disease, and eventually the whole state could boast of a cholera-free condition. Every farmer of Idaho should remember that the serum is a preventive and not a cure, and that its preventive powers are adequate only when applied before the disease has obtained a foothold.

THE FARMERS' DUTY

Every farmer ought to realize the necessity of taking every precaution against the spread of hog cholera. Hog cholera is practically an incurable disease. Some hogs naturally recover and are then immune, but the precautions taken should all be in the nature of preventives. These are the precautions to take:

1. Buy no hogs unless accompanied by a health certificate, signed by a Federal or State Veterinarian, stating that there has been no hog cholera on the place from which the hogs were purchased, within six months, and also that the purchased hogs have been treated with the serum treatment 15 days prior to purchase.
2. Sell no hogs, except for immediate slaughter, if you have cholera, on the place or have had it within six months.
3. Report to the State Veterinarian or his nearest deputy any sickness among your hogs.
4. Separate the well hogs from the sick ones.
5. Let one man look after the sick hogs only. There should be no communication between sick and well hogs, and the person attending the sick hogs should not go near the well ones nor any neighbor's herd.
6. Tie up or shoot all dogs.
7. Keep all fowls and birds out of the sick pens.

8. Do not let drainage from the sick pens reach natural or artificial streams.
9. Keep the sick pens dry and comfortable.
10. *Burn* all dead hogs.
11. Use the coal tar dips freely for disinfecting pens where sick hogs have been and on all well hogs that have been separated.
12. Use quick lime in the yards to destroy infection.
13. Whitewash the pens and houses as soon as the disease is eradicated and before other hogs are allowed in them.
14. If the state authorities pronounce the disease hog cholera, assist in maintaining a strict quarantine as provided by law.
15. Treat all hogs with the serum, according to the recommendations of the State Veterinarian or his deputy.
16. Form local Swine Breeders Associations and act for the best interests of the industry. An association can accomplish more than one man can working alone.

